Chapter Four: Current and Projected Uses of the Sale 87 Area

Contents

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A. Historical Background

Evidence of human occupation and use of the Arctic coastal plain dates back to 10,000 BC. Marine mammal harvesting on winter sea ice has occurred for at least four thousand years, and evidence of whaling is 3,400 years old (Langdon, 1996). The record of human existence on the North Slope is characterized by several distinct cultural periods marked by changes in tool style (NSBCMP, 1984a:2-1). The environmental characteristics of the Arctic shaped Inupiat culture into a semi-nomadic society with a tradition of whaling and an emphasis on seasonal inland hunting. This pattern of land use remained unchanged until the second half of the 19th century with the arrival of westerners, new tools, and due to natural events, such as caribou population decline (NSBCMP, 1984a)(NSB, 1979).

Numerous sites across the North Slope containing sod houses, graves, storage pits, ice cellars, bones and relics attest to the historical use and presence of Arctic people in the Sale 87 area, however, much of the archaeological record has been destroyed by erosion (Hoffman, et al., 1988). For centuries, trading centers, like Barter Island and Nigalik, at the mouth of the Colville River, were used by Canadian and Alaskan Eskimos (Jacobson & Wentworth, 1982). Eskimos of the North Slope also traded with Asia across the Bering Strait as early as the mid-1700's (Langdon, 1996) (NSBCMP, 1984a).

European explorers and fur traders began arriving in the Sale 87 area in the 1820s and 30s. This contact introduced metal tools, traps, and guns to support trading and hunting. Russian trading posts were established from Norton Sound southward. After bowhead whale migration paths were discovered, commercial whaling increased dramatically in the Arctic after 1850 and into the 1880's. Several whaling stations were built along the coast providing for regular contact and trading with Natives. Steamships replaced sailing vessels facilitating year round access. Increased hunting pressure and a natural decline reduced the population of the western caribou herd, and this coupled with western diseases, like measles and influenza, resulted in an increase in the death rate of the inland Eskimo. Coastal Inupiat also suffered population decline from foreign diseases (NSBCMP, 1984a)

By World War I, declining whale populations and decreased demand for whale oil and baleen brought an end to the commercial whaling period. However, demand for fur, particularly Arctic fox, resulted in continued presence of westerners along the Beaufort Coast and North Slope. Native residents engaged in trapping which provided income for non-subsistence resources. By 1914, trapping camps used in the thriving fur trade were established from Barrow to the Canadian border (NSBCMP, 1984a)(Hoffman, et al., 1988:8). In the 1930's, the price of fur plummeted which forced many traders to leave the region near the lower Colville River. Many residents moved to other settlements in Alaska (Hoffman, et al., 1988).

World War II brought an influx of military personnel into Alaska and the petroleum exploration period began. Inupiat were hired to work on construction projects, including the Naval Arctic Research Laboratory near Barrow in 1947, and the Distant Early Warning (DEW) line defense sites in the early 1950's (NSBCMP, 1984a). Before 1950, the lower Colville River supported many families, until the Bureau of Indian Affairs required that children attend schools, and most residents relocated in Barrow (NSB, 1979).

The contemporary period of modernization and change began in the 1960's. The discovery of the Prudhoe Bay oil field in 1967 prompted a renewed interest in petroleum exploration and development, but before oil reserves could be developed, Native land claims had to be settled. "In response to rapid change that

threatened Native land rights through land transfers, biological resource limitations, and natural resource leasing (primarily oil and gas), Inupiat political groups formed regional organizations to protect their rights and culture" (NSBCMP, 1984a:2-8). The Alaska Native Claims Settlement Act was passed in 1971 which created village and regional Native corporations and provided a mechanism for the transfer of land ownership to Native Alaskans (NSBCMP, 1984a). In 1973, 27 families of Kuukpikmiut (People of the Lower Colville) ancestry left Barrow and resettled Nuiqsut village (NSB, 1979)(Hoffman, et al., 1988).

Prior to the building period of the late 1970's and 1980's, few services were provided to residents, few jobs were available, and living conditions were austere across the Arctic Slope of Alaska. All communities lacked sanitation services, running water, telephones in homes, community centers and modern recreation facilities. The incorporation of the North Slope Borough in 1972 provided residents with local government powers and a mechanism to assess and tax oil and gas infrastructure. Incorporation also created responsibilities of planning, zoning, education and utilities. Petroleum revenues and other funding have provided the North Slope Borough with resources to pay for schools, fire stations, medical clinics, health care services, utilities, public safety facilities, family assistance programs, workforce development programs, community centers, public housing, administrative facilities, and jobs for borough residents (NSB, 1993).

B. North Slope People and Economy

The entire Arctic coastal plain of Alaska from the northern foothills of the Brooks Range to the Beaufort Sea, and from Point Hope on the Chukchi to the Canadian border is contained within the North Slope Borough's 94,770 square miles; an area about the size of Oregon. The financial and population center of the borough is located at the city of Barrow, incorporated in 1958. Other communities or villages within the borough include Point Hope, Cape Lisburne, Point Lay, Wainwright, Atqasuk, Nuiqsut, Kaktovik, Anaktuvuk Pass, and Deadhorse (ADCRA, 1995).

Three communities are within or near the Sale 87 area: Nuiqsut, Kaktovik, and Anaktuvuk Pass. Nuiqsut is located within the sale area on the Colville River delta, Kaktovik is located about 70 miles to the east of the sale area on the north shore of Barter Island and Anaktuvuk Pass is located approximately 85 miles south of the sale area in the central Brooks Range. These villages are likely to feel the greatest impact on subsistence activities from the sale. If reserves are discovered and developed, all Alaskans may experience the economic effects of Sale 87 through permanent fund dividends, and state services and programs funded by petroleum revenues.

Barrow is located more than a 100 miles to the west of the Sale 87 area. Although numerous businesses in Barrow provide support services to oil field operations, residents are not likely to be affected by the sale, unless they harvest subsistence resources in the Sale 87 area, are employed by local government, or work with or in the oil and gas industry. For a discussion of the reasonably foreseeable fiscal effects of the sale, see Chapter Five.

1. Population and Housing

As of July 1996, the Alaska Department of Labor estimates the 1996 NSB population to be 7,157; a 2.9 percent increase from 1995. In the previous year, the borough population was 6,950; a 16 percent increase from 5,979 in 1990 (ADOL, 1996a). Seventy-two percent of NSB residents are Native Alaskan Inupiat Eskimos. The 1990 U.S. Census estimated there were 2,153 housing units in the borough, 22 percent of which were not occupied. Nearly 1,000 housing units were being rented with a median monthly rent of $600. In the 1990 census year, one in three adults were not in the wage earning portion of the economy (ADCRA, 1995).

Barrow was home to 4,276 residents in 1996; 64 percent of whom are Native Alaskan. Barrow's population grew an average of 4.2 percent per year between 1990 and 1996 (ADOL, 1996a). This rapid natural increase in population has resulted in a large proportion of Barrow's population being of school-age. Of the 1,110 students in Barrow schools, two-thirds are at the elementary level (ADCRA, 1995).

Anaktuvuk Pass is home to 306 residents, up eighteen percent from 1990. In 1995, one hundred and nine students attended the local school (ADCRA, 1997). In 1990, there were 81 housing units in Anaktuvuk Pass, of which 41 were owner-occupied. Median home value (owned) in 1990 was $100,000. Of all housing units, 65 were single family homes, four were multi-unit structures, and one was a boat (ADCRA, 1995).

Nuiqsut was home to 410 residents in 1995, up sixteen percent from 1990 (ADCRA, 1995). In 1993, nearly one-third of all residents were under the age of 10 (ADF&G, 1995) and in 1995, 137 students attended Nuiqsut Trapper School (ADCRA, 1995). In 1990, there were 102 housing units in Nuiqsut, of which 57 were owner occupied. Thirty-four units were being rented with a median monthly rent of $300. Median home value (owned) in 1990 was $83,200. Of all housing units, 94 were single family homes, three were three-to-four unit structures, and the rest were boats or some other type of structure (ADCRA, 1995).

Kaktovik was home to 210 residents in 1995, down slightly from 1990 (ADCRA, 1995). In 1992, about 23 percent of Kaktovik residents were under the age of 10 (ADF&G, 1995) and in 1995, fifty-eight students were enrolled in the local school (ADCRA, 1995). In 1990, there were 82 housing units in Kaktovik, of which 36 were owner occupied. Thirty-one housing units were being rented with a median monthly rent of $289. Median (owned) home value in 1990 was $85,800. Of all housing units, 73 were single family homes, four were trailers or mobile homes, and the rest were some other structure type (ADCRA, 1995).

Deadhorse, the industry support community located near the center of the Prudhoe Bay-Kuparuk oil fields was settled during the development years of the 1970's. The transient work force is not counted by the U.S. Census, because they reside in other communities. According to the Department of Community and Regional Affairs, Deadhorse/Prudhoe Bay is home to just 71 residents. About four to five thousand employees work at the Deadhorse industrial complex, but only a small number are considered full time residents (ADCRA, 1995, ADOL, 1996a).

2. Transportation and Utilities

Barrow is an historic trading center for Arctic Alaska. Transportation in winter is accomplished via snow machine over trails which connect villages and campsites. Dogsleds are also used for transportation. In summer, boats navigate rivers. Air transportation links all communities on the North Slope year-round. Barrow residents get their electric power from the member-owned Barrow Utilities & Electric Cooperative, which also operates the city's water and sewage treatment plant, and distributes natural gas for heating to nearly every household. About half of Barrow households are connected to a public sewer system, and the other half use honeybuckets (ADCRA, 1995).

Anaktuvuk Pass has an airstrip owned and operated by the NSB and provides the community with year-round access. There is no road to Anaktuvuk Pass, ìCat-trainsî transport cargo from the Dalton Highway during the winter months. Electricity is provided by the North Slope Borough Power and Light system. Almost 80 percent of the homes have running water; flush toilets and showers are planned for all residences (ADCRA, 1997).

Transportation to and from Nuiqsut is provided by an airstrip year-round and snow machine or ice road in winter. In summer, river boats navigate down the Colville River to the Beaufort Sea or upriver to Umiat via the Colville, Itkillik, Chandler, Anaktuvuk and other rivers. Nuiqsut residents derive electric power

from a NSB Power & Light System. Over 70 percent of homes have complete plumbing. Residents have individual water tanks and water is supplied by a public surface water system. Ninety-seven percent of homes are heated with fuel oil or kerosene. The community has no sewer system, and residents must use honeybuckets, however, a water and sewer project to provide running water, flush toilets, and showers to residents is underway (ADCRA, 1995).

Air travel provides year round access to Kaktovik via the Barter Island Airport, owned and operated by the U.S. Air Force. Kaktovik residents derive electric power from a NSB Power and Light System. Currently, the community has no sewer system, and residents must use honeybuckets; funding for flush toilets, showers, and plumbing is pending. Fresh water is derived from a surface source, and is treated and stored in a 680,000 gallon water tank. Water is then delivered by truck to households. (ADCRA, 1995).

Deadhorse is located near the terminus of the Dalton Highway on the Beaufort coast, which provides year-round access to Fairbanks and beyond. This community is serviced by jet aircraft, and also marks the start of the Trans-Alaska Pipeline. Deadhorse derives its electric power from the burning of natural gas at two main power generation facilities, and from waste heat generated from oil and gas processing. This electricity is distributed via utility lines to Kuparuk oil field in the west, and Endicott to the east. Freshwater is obtained from nearby lakes, and all wastewater is treated before discharge into ponds. (ADCRA, 1995).

3. Occupations and Earnings

Local government is the largest employer of NSB residents, yielding one in three full-time positions. In 1990, local government provided 1,454 jobs, the private sector employed 891, federal government employed 177, and state government employed 60. Of those engaged in wage earning positions, more than half were employed in the administrative and health services sector. In 1990, thirty-five percent of the borough's 2,531 residents were old enough to participate in the wage earning work force, but did not (ADCRA, 1995). A 1993 survey revealed that for all communities in the borough, except Barrow, more than one in three residents indicated they were involuntarily under-employed (NSB, 1993). Self-employment and non-paid activities provide other occupations. Seven residents held commercial fishing permits in 1995. Median household income in the borough was $50,473 in 1990 (ADCRA, 1995).

According to the Alaska Department of Labor, more than $485 million was earned in the NSB in 1995. Government payrolls accounted for about 20 percent of that (almost $105 million), and the oil and gas extraction industry accounted for approximately 55 percent ($267 million). More than $29 million went to construction workers, $27.5 million were earned in the transportation, communications, and utilities sector, and more than $30 million went to the services sector, mostly in the business services segment. The 1995 earnings from local government exceeded $99 million (ADOL, 1996b). See Chapter Five "Fiscal Effects" for additional information on NSB employment.

Median household income for Anaktuvuk Pass was $37,292. Local government is the largest employer, providing 48 jobs out of a total workforce of 84. Economic and employment opportunities in Anaktuvuk Pass are strongly influenced by its isolation. Hunting and trapping for the sale of skins, guiding hunters, or making traditional caribou skin masks or clothing provide income (ADCRA, 1997).

The median household income for Nuiqsut was $32,188; a 14.4 percent increase from 1980. Cash employment in Nuiqsut is limited, due in part to its isolation (ADCRA, 1995). Nearly two thirds of the wages earned in Nuiqsut in 1993 came from local government which provided more that 55 percent of all wage earning jobs in the community. Eighty-five percent of households had one or more members employed in local government, 32 percent had members employed in construction, almost 20 percent had members employed in the finance, insurance, and real estate sector, and 16 percent of households had members

employed in the trade industry (ADF&G, 1995). For all households in the community, average gross income in 1993 was $56,629. Of the estimated 176 adults in the community, those who participated in the wage earning portion of the economy had worked between two and three jobs (ADF&G, 1995).

Median household income for Kaktovik was $42,265 in 1990, a 9.4 percent increase from a decade earlier. Cash employment in Kaktovik, like Nuiqsut and other remote villages is also limited (ADCRA, 1995). Nearly 80 percent of the earned income for the community came from local government which provided more that 60 percent of all wage earning jobs in the community. In 1992, nearly every household in Kaktovik had one or more members employed in local government, 35 percent had members employed in the finance, insurance, and real estate sector, and 15 percent had members employed in the trade and manufacturing sector (ADF&G, 1995). For all households in the community, average gross income in 1992 was $55,688. Of the estimated 129 adults in the community, the number of jobs per person averaged 2.34 (ADF&G, 1995).

Deadhorse's four to five thousand employees work and live in the surrounding oil field complex. Most oil industry employees work 12-hour shifts, seven days a week, on a two-week-on, two-week-off schedule. Permanent residents of the community are employed principally in the wholesale trade, retail trade, mining (oil and gas extraction), and personal services industries (ADCRA, 1995). The importance of local government in providing services, improving the standard of living, and in providing sources of cash and employment to residents cannot be overemphasized. For detail on NSB and municipal government finance, see Chapter Five.

C. Subsistence and the value of fish & wildlife

For a thorough compilation of subsistence base-line information for the Sale 87 area, see Pederson et al., (1985) and (1991); Hoffman et al., (1988); MMS (1995) (1990) and (1987); Jacobson and Wentworth (1982); ADF&G, (1995); NSBCMP (1984a)(1984b) and (1988); and NSB (1997)(1979). For attention to social and cultural impacts, see (MMS, 1995) socioeconomic indicators study, and (NSB, 1979).

1. The meaning and protection of subsistence values

In its most minimal definition, subsistence is sustenance and subsistence uses at least include hunting, fishing and gathering for the primary purpose of acquiring food (Bryner, 1995, citing to Case, 1984). Under title 19 of the North Slope Borough Municipal Code (NSBMC), subsistence is defined as "an activity performed in support of the basic beliefs and nutritional needs of the residents of the borough and includes hunting, whaling, fishing, trapping, camping, food gathering, and other traditional and cultural activities." (NSBMC 19.20.020(67)) ANILCA defines subsistence usage as the customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade (16 U.S.C. § 3113) (Bryner, 1995). Subsistence in Alaska is more than harvesting, gathering, processing, sharing, and trading. Subsistence also includes cultural, social, and economic values associated with the taking, use, and exchange of plants, fish and game. Subsistence embodies the essence of Inupiat culture.

Inupiat culture is characterized by strong kinship ties, cooperative efforts, and sharing. Inupiat who maintain a close relationship to the land and perpetuate an understanding of the seasons and animals by educating youth are highly respected. Land and the natural environment is primary and sacred in the Inupiat world view. Names and songs identify the land. Inupiat see man's place in the universe as a member of the world in contrast to a western view where man is placed in this world. The Inupiat view, being a part of the

environment, rather than apart from it, resulted in a subsistence life of complete dependence on the near environment, weather and living resources (NSB, 1979).

Most subsistence resources harvested are shared, traded or given to others. Non-subsistence goods purchased with wages are also shared. Subsistence resources cannot be purchased with money, and they must be "earned" by hunting. On the other hand, subsistence technology, such as boats, all-terrain vehicles, fuel, and gear can be purchased with cash.

The collection, processing, and distribution of subsistence resources nearly always involves some group activity, and thus to Alaskan Natives, subsistence, " ... also encompasses a complex web of relationships that define and distinguish their traditional culture." (Bryner, 1995:299). The continued opportunity to engage in subsistence uses is a fundamental component of all Alaska Native cultures, and serves as the keystone to social, ethnic and psychological identity.

Since the discovery of oil in Prudhoe Bay and the advent of oil and gas infrastructure development in the Arctic, village elders, and traditional Inupiat persistently express concerns that subsistence is being threatened. The once open range of the Kuparuk and Sagavanirktok Rivers is now complicated by the presence of above-ground pipelines, spine roads, utility lines, and large facilities. Village leaders affirm that both outside pressures, and pressures within communities are challenging the system of values which has bonded them together (NSB, 1979).

Some western institutions have been willfully adopted into village life, such as education, health care, and economic necessities, like home building materials and fuel (NSB, 1979). Others have not, such as some fish and game regulations. For example, catch and release fishing, may be considered disrespectful in some Native cultures (Noland & Gallagher, 1989). Imposed seasons and bag limits restrict the taking of game, like caribou, which were previously harvested year-round (Jacobson & Wentworth, 1982). Many traditional hunting, fishing, and gathering sites are on federally or state managed land. Private and public ownership of lands and waters tells people where, when, and sometimes how they may hunt.

The Nuiqsut Cultural Plan (NSB, 1979), published just after the construction of the Trans-Alaska Pipeline, identified forces converging upon the Inuit culture: competing interests, oil and gas development, environmental degradation, access and use limitations, land tenure problems, socio-economic instability, and loss of cultural privacy (NSB, 1979). All of these forces pose a threat to subsistence life and the traditional Inupiat culture.

To assure subsistence is protected, the locations of harvest areas and sites, and the harvest and participation levels (demand for resources) must be identified. Also, it is essential and legally mandated that healthy populations of fish and wildlife be conserved. When it is necessary to restrict the taking of fish and wildlife, subsistence uses are given priority over all other consumptive uses. Federal and state laws regulate subsistence use, access, and the trading of subsistence resources. On federal lands, the federal government is required by Title VIII of ANILCA (1980) to provide a subsistence priority for rural Alaskan residents unless the state provides this priority through its laws. Subsistence use and allocation of fish and game is codified in state law under AS 16.05.258. Subsistence uses in Alaska are regulated by the U.S. Fish and Wildlife Service, Office of Subsistence Management, and the Alaska Department of Fish and Game, Division of Subsistence. For a discussion on the effects of this lease sale on subsistence uses, see Chapter Five.

2. Subsistence and the mixed-cash economy

ADF&G conducts subsistence harvest surveys of communities throughout Alaska, and results are compiled in a computer database. Indicators tracked by ADF&G help to describe how the modern subsistence

economy is functioning. Some indicators include species availability and abundance within traditional subsistence harvest zones; and levels of participation by community members in subsistence harvesting. These are discussed in some detail below. Another indicator characterizing the cash-non-cash economic mix is the amount and distribution of cash income among residents of the area or community. This varies among communities, depending on subsistence resource availability and the availability of jobs. The costs and availability of goods and services in a community also affect the cash-non-cash mix. In 1993, the cost of a standard market basket of food goods was 2.19 times higher than in Anchorage (ADF&G, 1995).

The relationship between earning cash wages and engaging in subsistence activities is different for each individual, and depends on individual life choices and the flexibility of the available wage employment. Many residents choose to work seasonally, part-time, or just temporarily. Use preferences of individuals depend on cash availability (cash for supplies and transportation), job or village responsibilities, and resource preferences (NSB, 1979:30). Those who choose to hunt are likely to benefit from shared resources derived from wage earners, and vice versa (NSB, 1979) (Jacobson & Wentworth, 1982). Residents holding cash paying positions conduct subsistence activities during non-work periods, weekends, and vacations (NSBCMP, 1984a).

Employment for wages, including full-time, part-time, temporary, and seasonal positions have both advantages and sacrifices for village residents. Wages provide residents with cash necessary to function in modern village communities, and provide families with money for housing and associated costs. The increase in job opportunities created by the NSB has resulted in more disposable income in the communities of the NSB. However, generally time spent earning cash wages is time not spent engaging in subsistence activities (Bryner, 1995). Employers are encouraged to provide residents with the opportunity to participate in subsistence activities during key seasonal events, such as fall whaling, without losing their jobs.

A small percentage of full-time oil industry jobs on the North Slope are held by local residents. This is partly explained by the small labor supply of the NSB relative to the large labor demands of industry. While some full-time oil industry positions may be available in a community, the social costs of not participating in the traditional portion of the village economy may be greater than the cash benefits and income stability derived from participation in an oil field development labor force. The remoteness of villages with respect to oil field infrastructure coupled with long shift hours means that employees are more likely to be separated from their families and children.

3. Seasonal cycle of economic activity and subsistence use areas

Seasons on the Arctic coast are marked by the arrival and departure of sea ice, river ice, and changing winds. After the break-up of river ice and the retreat of fast ice along the shoreline, the tundra thaws and mobility is mostly restricted to open waterways and established trails. Seasons are also marked by the arrival and departure of migrating caribou, waterfowl, and the bowhead whale. In the summer, the primary mode of transportation is by small skiff (14 to 18 ft), which can navigate the shallow channels of the river deltas and lagoons, and by ATV for overland access. In winter, snow machines and, to a lesser degree, dogsled teams provide transportation to hunting and fishing camps and trade fairs. Historical subsistence access routes on the North Slope follow all major rivers and skirt the coast from the Canadian border to Wainwright and beyond. The seasonal cycle of subsistence harvesting is portrayed in Figure 4.1. Subsistence use areas in the Sale 87 area are depicted in Figure 4.1.

For residents of Nuisqut, fishing occurs both during the summer and in the fall when the ice first becomes thick enough for snow machine travel. In June, after the ice goes out, broad whitefish move upriver. Two to four weeks after break-up, when muddy waters clear, fishing begins (Hoffman, et al., 1988:15).

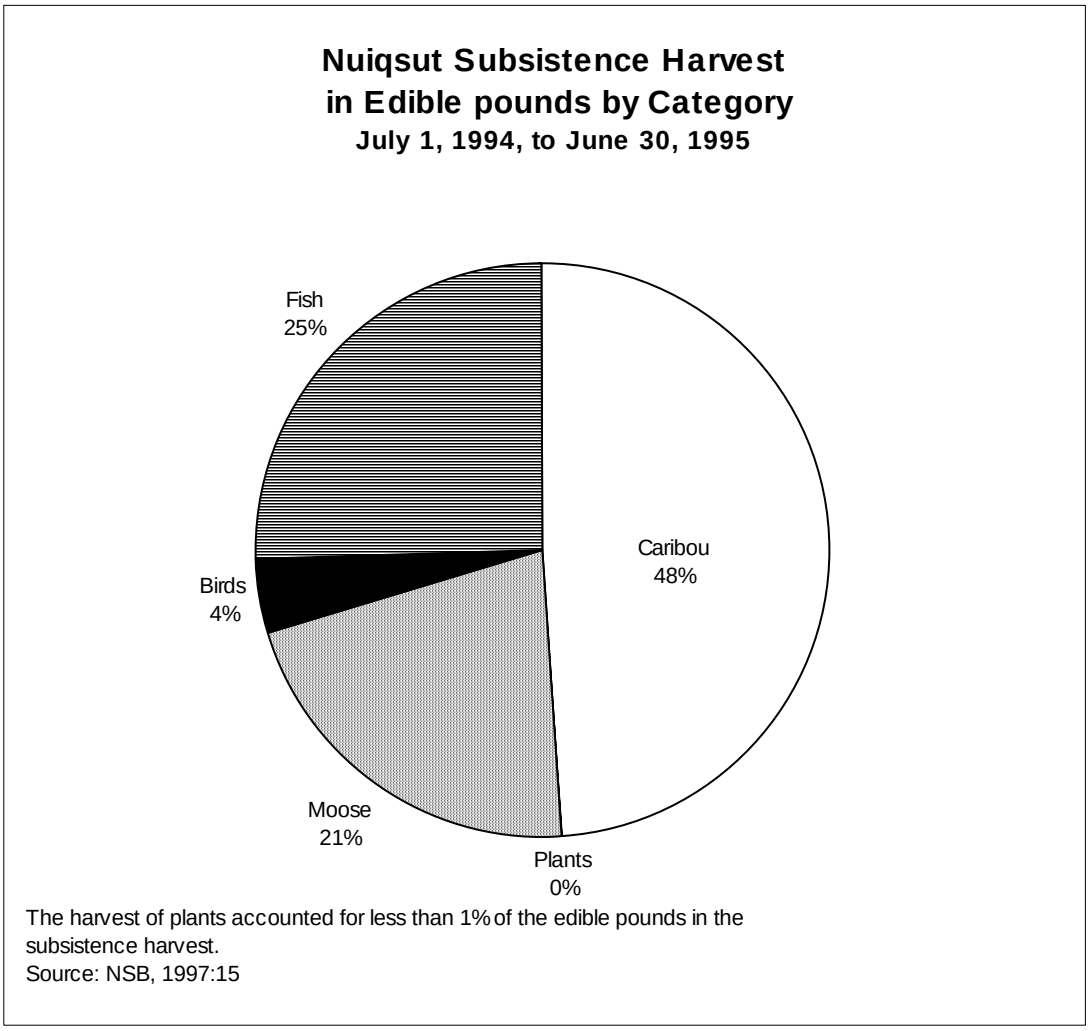
Residents travel from the village to fish camps along the river channels and fish and hunt for several days. Often several family members participate in the fishing activity, and family members employed in wage earning positions may travel to the fish camp on weekends (George and Nageak, 1986:14). Important traditional use sites along the lower Colville include Uyagagviit, and Nigliq (Nannie Wood's Camp), which according to Nuiqsut Vice-Mayor Leonard Lampe (1996) has hosted subsistence fishers and trappers since the late 1940's. Numerous other sites in use today are recorded in the NSB Traditional Land Use Inventory. Some important traditional use sites are depicted in Figure 4.2 (Hoffman, et al., 1988)(NSB, 1979)(ADF&G, 1986)(Jacobson & Wentworth, 1982).

Geese and King Eider ducks fly low from west to east across the deltas, along the coast in June, and are hunted with shotguns (Hoffman, et al., 1988). Caribou of the Central Arctic Herd (CAH) approach the Colville Delta in late May and early June, and calve in the area between the main channel of the Colville and Sagavanirktok River deltas. Also during June and into July, moose travel north along the upper Colville and Itkillik Rivers where they may be harvested later in the fall (Hoffman, et al., 1988).

Summer fishing with gill nets lasts throughout the open water season, from early June to mid-September with the broad whitefish being the preferred and most numerous species caught. Species harvested are the Arctic char, whitefish, cisco, burbot and grayling. A few chum and pink salmon are also taken. Gill nets account for almost all the fish caught (ADF&G, 1995). Grayling may be caught with rod and reel or with nets in creeks. Hunting of ringed and bearded seal begins in July in the open water off the delta and continues throughout the summer months (Hoffman, et al., 1988:16).

Figure 4.1 Seasonal Use Harvest Activities

Figure 4.2 Subsistence Use Areas and Sites



The harvest of plants accounted for less than 1% of the edible pounds in the subsistence harvest.
Source: NSB, 1997:15

In the fall, the fish harvest consists mainly of least and arctic cisco, though other species of fish are also caught, and generally lasts only two to three weeks. The rate of fish harvest is significantly higher in the fall than during the summer season (George and Nageak, 1986: 16) when Arctic char and salmon begin their migration upriver. Small whitefish and Arctic cisco are harvested near the ocean, but these species do not move far upriver. Spotted seals, valued for their skins follow the salmon and char upstream, where they are hunted as far south as the confluence of the Itkillik and Colville Rivers. Near the end of August is the optimum time to harvest caribou. At this time, caribou are fat from grazing all summer and fit for their long migration south. The hide is in good condition for making clothing and it is before rutting season; a time when the bulls are not good to eat (Hoffman, et al., 1988). As in Kaktovik, blueberries, cloudberries, cranberries, wild potato and wild rhubarb are harvested (Jacobson and Wentworth, 1982).

In September, caribou begin moving down the Ublutuoch River, and east across the Colville, before heading south toward the Brooks Range. After calving, caribou from the CAH move toward the Sagavanirktok and follow it south to the mountains. Arctic cisco and small whitefish run upriver just before freeze-up (Hoffman, et al., 1988). Residents hunt moose in an area between the village and the confluence of the Anaktuvuk and Colville Rivers. However due to a steep decline in moose populations on the North Slope, residents may need to travel further upriver for a successful harvest (Carroll, 1996).

For Nuiqsut, whaling begins in the first week of September. Whaling teams travel by boat down the Colville River through Simpson Lagoon and set up camp at Cross or Nora Island; a trip that takes about eight hours according to whaling captain Frank Long (1996). From there, teams in either skin boats or moderately sized skiffs, travel as quietly as possible into the Beaufort Sea, north, northeast, and east of Cross Island as far as 44 miles out (Long, 1996) into the fall migratory path of the bowhead whale. A well known whaling captain and former mayor of the NSB describes the method; "During the fall hunt, boats move at very low speeds until a whale is spotted." (Ahmaogak, G.,1996b). Whaling boats based out of the Cross Island camp as long as two weeks or more. Often, seas are rough, and the further offshore crews must travel to find whales, the greater the risk. Ringed and bearded seal, king eider, caribou and polar bear may also be hunted during whaling expeditions (Hoffman, et al., 1988). After a whale is struck, it is towed to Cross Island, pulled onshore with a winch, and butchered. Then, the whale is transported by boat to Nuiqsut, or to West Dock or Endicott and trucked to Olitok Point (Long, 1996). Historically, whole villages have participated in the processing and distribution of whales taken from the Beaufort Sea. The whale is shared during potlucks throughout the year, and at Thanksgiving, Christmas, and "Nalukataq"; the harvest feast where fish, caribou, whale meat, and muktuk is portioned out to every member of the community (NSB, 1997:30)(MMS, 1996)(Jacobson & Wentworth, 1982).

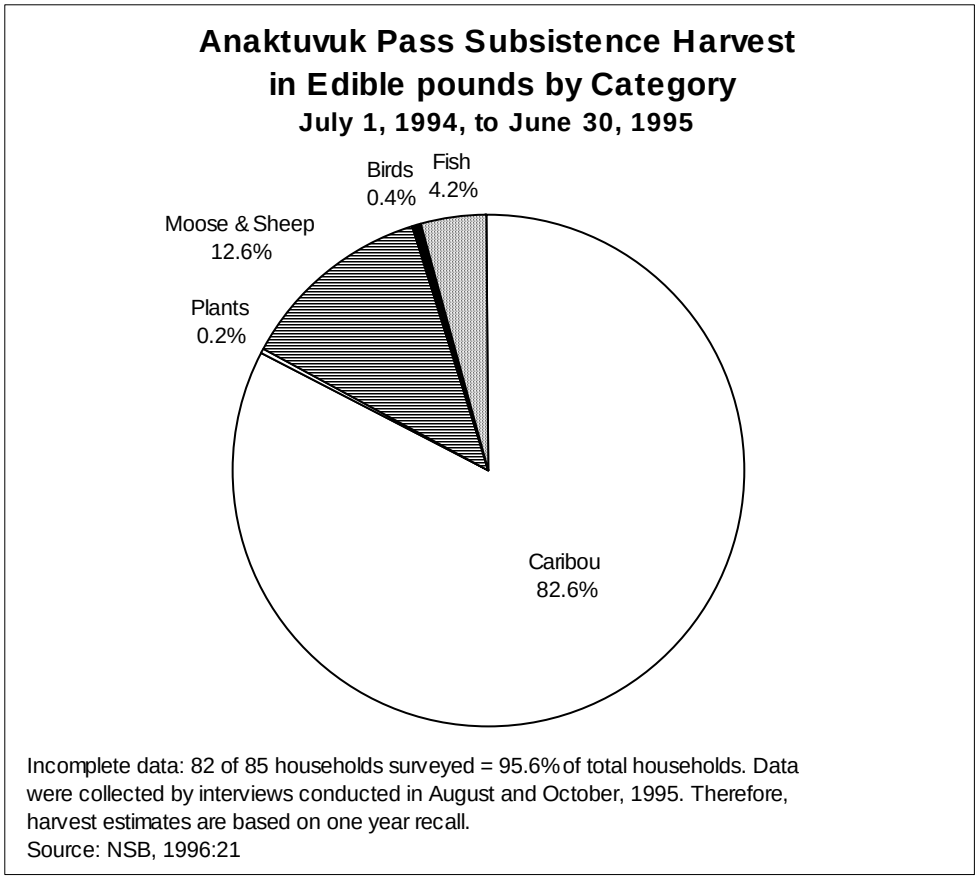
In 1996, Nuiqsut harvested two whales (about 4 miles north of Narwhal Island), and transferred the remainder of their quota to Barrow, because two was enough to feed the community (AEWC, 1997). This general description of traditional whaling is included here because of its importance to Inupiat culture. However, whaling should not be affected by Sale 87 activities because it is a totally onshore sale.

After the rivers freeze by mid-October, residents travel by snowmachine to fish camps on the Colville River or Fish Creek to fish for Arctic cisco and small whitefish (Hoffman, et al., 1988). Ice fishing is accomplished by cutting holes in the ice, and then stretching gill nets under the ice (George and Nageak, 1986: 16). Hook and line is used to ice fish for lingcod and grayling. Some moose and caribou hunting may occur during October and November (Hoffman, et al., 1988). Polar Bears are hunted from October to May (NSB, 1979).

In December, Arctic fox, cross fox, red fox, wolves, and wolverine are trapped or shot. Some caribou and moose may be harvested, and seals taken in the remaining open leads of sea ice. From January to March, trapping continues, and some hunting of caribou and moose may occur, depending on the depth of the snow and ability to move about (Hoffman, et al., 1988).

Mid-April brings an end to trapping season. Hook and line fishing for lingcod and lake trout resumes. The hunting of wolf and wolverine by rifle is accomplished by snow machine, and seals sunning themselves on the sea ice are also harvested year round. These conditions persist through May until the river ice again washes out to sea, completing the annual cycle of subsistence harvest (Hoffman, et al., 1988).

Anaktuvuk Pass residents mainly use the river corridors of the Colville, Itkillik, and Anaktuvuk rivers for subsistence activities within the sale area (Pederson, 1997). The annual subsistence cycle of Anaktuvuk Pass revolves around the caribou. In a survey conducted by the North Slope Borough Department of Wildlife Management, caribou accounted for 82.5†percent of the harvest in edible pounds for a one year period. The reported number of caribou harvested during the study period (July 1, 1994, to June 30, 1995) was 311. This is low when compared with previous years for which harvest data are available. For example, in 1990-91, the estimated harvest was 592; in 1993-94 it was 574 (NSB, 1996:13).

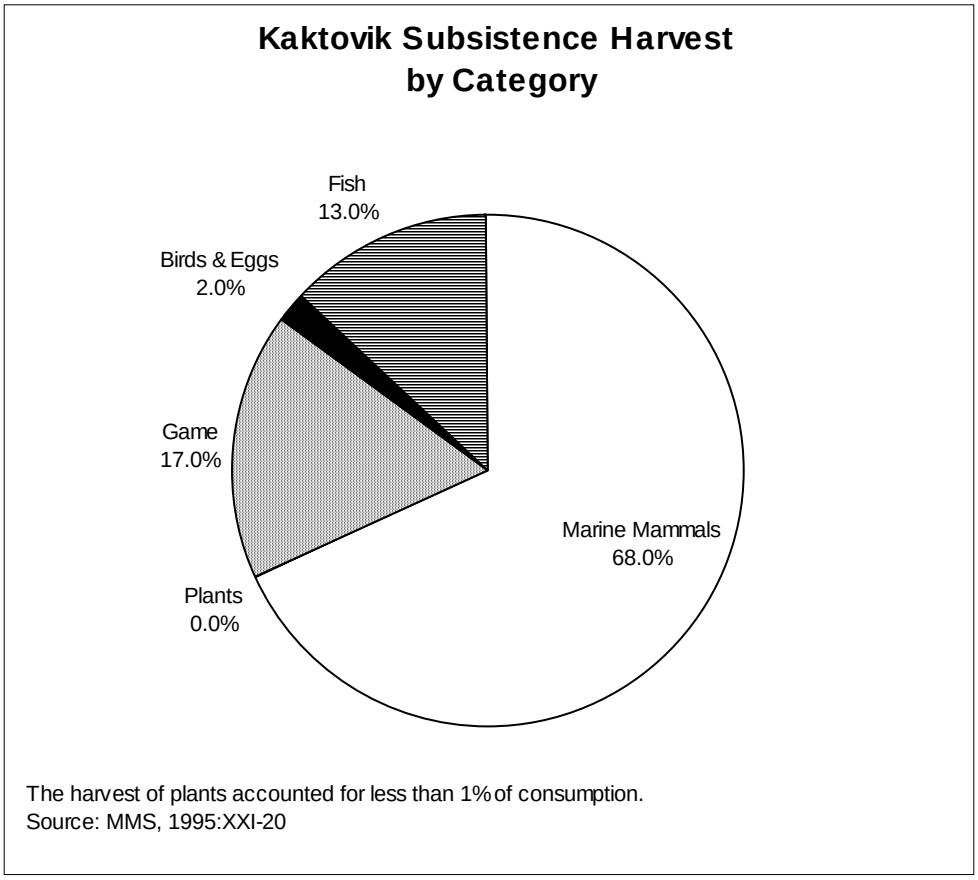


Incomplete data: 82 of 85 households surveyed = 95.6% of total households. Data were collected by interviews conducted in August and October, 1995. Therefore, harvest estimates are based on one year recall.
Source: NSB, 1996:21

Intensive caribou hunting occurs in April and May as animals move through the Brooks Range on spring migrations northward. Caribou hunting intensifies again in the fall as the animals begin to move southward. During the winter caribou are occasionally hunted, but they are in less desirable condition at this time of year (ADF&G, 1986:571).

Fish and birds are considered of minor subsistence value to Anaktuvuk Pass residents but are crucial during times when other resources are scarce. Important fish species include grayling, Arctic Char, lake trout, and whitefish. Anaktuvuk Pass residents do not harvest many ducks or geese compared to hunters in other North Slope villages because waterfowl in the central Brooks Range are generally scarce. The types of birds harvested include Oldsquaw, pintail, and White-fronted geese. Ptarmigan are considered the most important species and are harvested year round (NSB, 1996:15).

Kaktovik subsistence harvest areas range from east of the Canadian border to Camden and Mikkelson Bays. Traditional Land Use Inventory sites are discussed in Jacobson and Wentworth (1982). Important locations in the Kaktovik Traditional Land Use Inventory (TLUI) in or adjacent to the sale area include Flaxman Island, Brownlow Point, and Tigutaaq at the confluence of the Tamayariak and Canning Rivers. The primary early winter camps of Kaktovik people are located along the Hulahula and Sadlerochit Rivers (Jacobson and Wentworth, 1982).



The harvest of plants accounted for less than 1% of consumption.
Source: MMS, 1995:XXI-20

The annual cycle of subsistence activity for Kaktovik is similar to that of Nuiqsut; the same species are harvested at the same time, but from different lakes, rivers, uplands, islands, estuaries, and marine waters. Residents travel to the mountains to hunt wolf, sheep, wolverine, and moose in March. April and May are important months for the taking of ground squirrel, ptarmigan, and marmot. In late May and early June, residents camp in the Camden Bay area to hunt migrating waterfowl, such as eider and brant. By June, mobility is increasingly restricted due to spring thaw. Birds, seals, and caribou are hunted closer to Barter Island. After calving in late May and early June, caribou of the Porcupine herd graze about the area between the Canning River and the Mackenzie River delta. By late June, land travel is restricted, and the sea ice still remains. In July, the sea ice goes out, and hunting of caribou, and fishing of arctic char with nets is accomplished by boat. In the fall, caribou begin moving toward winter habitat on the south side of the Brooks Range. The month of August is good for fishing char and arctic cisco (Jacobson and Wentworth, 1982).

4. Harvest levels of plants, fish and game, species variety and participation levels

Factors affecting subsistence harvests include: the availability of fish and wildlife populations, weather, terrain, methods of harvest, availability of transportation, state and federal hunting and fishing regulations, local economic conditions, availability of cash for supplies and transportation (Jacobson and Wentworth 1982:30) (Pederson, Coffing, and Thompson, 1985:15), the changing condition of the meat, hide or fur (Jacobson and Wentworth, 1982:29), and community needs. Soggy tundra and shallow rivers restrict most summertime activities to coastal areas, but frozen ground, snow cover, ATVs, and snow machines expand harvest areas during the winter.

Subsistence resources are shared between wage earning and non-wage earning members of the community as well as with relatives and others living in North Slope communities, Fairbanks and Anchorage. While families in the 1980's were smaller than in previous periods, all family members are still engaged in subsistence activities and sharing (NSBCMP, 1984a:2-20).

Fish, caribou and bowhead whales comprise the bulk of the nutritional needs of the Inupiat (ADF&G, 1995) but other animals are also important for both their nutritional and cultural uses. The harvesting of certain animals, like wolf and wolverine, have different value than other animals.

Nuiqsut residents harvested an average of 741.8 pounds per person of usable subsistence resources for home use and non-commercial exchange between households in 1993 (See Table 4.1). Fish comprise nearly a third of the subsistence wild resource harvested by Nuiqsut residents, land mammals another third, and marine mammals also a third. Birds and eggs accounted for about 2 percent of the community harvest (ADF&G, 1996a).

Species harvested in the Sale 87 area include salmon, cod, rainbow smelt, burbot, arctic char, arctic cisco, least cisco, lake trout, grayling, sheefish, whitefish, brown bear, polar bear, caribou, moose, muskox, arctic fox, red fox, ground squirrel, wolf, wolverine, weasel, marmot, mink, ducks, geese, brant, ptarmigan, sandhill crane, tundra swan, salmonberries, blueberries, blackberries, cranberries, greens, and mushrooms (ADF&G, 1995)(NSB, 1997). On average, Nuiqsut households used more than 20 different kinds of wild resources, about 12 types of resources were shared, and eleven varieties given away (ADF&G, 1996a). Edible pounds harvested from selected resources are listed below.

Table 4.1 Nuiqsut Subsistence Harvests

Nuiqsut Per Capita Edible Pounds Subsistence Resources Harvested, 1993	
Resource	Per Capita Harvest (pounds)
Fish	250.6
Caribou	227.6
Bowhead whale	213
Ringed Seal	20
Moose	12.2
Bearded Seal	3
White-fronted geese	3
Ducks (Eider)	2.9
Canada Geese	2.3
Brown Bear	2
Vegetation and Berries	1.1
Brant	1
Total (including other resources harvested in 1993)	741.8

In the 1985 survey year, subsistence harvests averaged about 400 pounds per person, most of which consisted of caribou and whitefish. At that time, the bowhead harvest was limited, but in the following years, marine mammal harvests gained an increasing proportion of the total subsistence harvest for the community. With the per capita harvest nearly doubling between 1985 and 1993, the importance of Nuiqsut's subsistence harvest is underscored. "This is significant to keep in mind as Nuiqsut's immediate subsistence resource area is presently undergoing intensive oil and gas exploration, and increasing industrial development associated with oil extraction is taking place within Nuiqsut's general subsistence resource area." (ADF&G, 1996a:3)

In 1993, 94 percent of the 242 edible pound per capita land mammal harvest consisted of caribou. Caribou are an important subsistence resource for local residents. An estimated 672 caribou were harvested by Nuiqsut residents in 1993 (ADF&G, 1995), probably from the Central Arctic herd. Caribou are a staple food

that is eaten fresh, frozen, and dried. When available, caribou can provide a source of fresh meat throughout the year. The skins of caribou are used to make blankets, sleeping pads, parkas, boot soles, mitts, and masks. Moose and brown bear hunting also occurs along the Colville River, and nine moose were harvested by village residents in 1993, however, the moose population near Nuiqsut has declined rapidly in this decade. About 600 small land mammals were harvested by Nuiqsut residents in the survey year as well as over 300 ground squirrels, 200 foxes, 31 wolves, about 20 wolverine, and 10 weasels (ADF&G, 1995).

More than half of the 12 pound per capita harvest of birds in 1993 consisted of geese; the remainder consisted of ducks and ptarmigan. Nuiqsut village harvested about two Eider ducks, one brant, two Canada geese, two white-fronted geese, and three ptarmigan per person in 1993. Sixteen snow geese, seven tundra swans, 78 oldsquaw and 25 pintail ducks were harvested by village residents in that year. Additionally, over 100 pounds of Eider duck and geese eggs were harvested by Nuiqsut residents in 1993 (ADF&G, 1995).

In 1993, bowhead whale made up 90 percent of the 236 pound per capita marine mammal harvest. Ringed seals made up the remaining 20 pounds; about one seal for every four people. About six bearded seals were harvested in Nuiqsut. Polar bears are also hunted in the Sale 87 area. Occasionally, walrus may be taken if the opportunity arises (ADF&G, 1995).

In 1993, 46 percent of the 250 pound per capita fish harvest consisted of broad whitefish, 39 percent were either Arctic cisco or least cisco, 7 percent were burbot, 5 percent were grayling, and the remainder included Arctic char and salmon (ADF&G, 1995).

All Nuiqsut households used subsistence resources in 1993. Ninety-four percent attempted to harvest subsistence resources, with 90 percent being successful. Ninety-eight percent of all households in the community received wild resources, and 92 percent gave away wild resources (ADF&G, 1995).

In addition to being personally consumed, a large, but unknown portion of the fish caught are either shared with other communities in the area, or sold. (George and Nageak, 1986: 15). Most Nuiqsut families participate in subsistence fishing activities. The bulk of the fishing in the 1980s was probably done by about half the families in the area (George and Nageak, 1986).

Subsistence resources are utilized for much more than nutrition. Many non-edible parts of the animals harvested are used to make both functional items, and arts and crafts. Driftwood and willow brush are collected for firewood and building materials. Marine mammal bones and hides have also been used to construct temporary shelters and traditional boats. Caribou hides are used for bedding, clothing, and masks. Seal skins are used for carrying water and for covering traditional boats. Whale baleen is decorated and etched into story-telling art works and baskets. Ivory, caribou antler and bone, and whale bones are carved into miniature animals, umiaks, and hunting scenes or made into functional items, like knife or ulu handles and needle cases. Jewelry is made out of many things, including ivory, antler, feathers and imported beads. Bearded seal whiskers are used in making earrings. Wolverine, wolf, polar bear, seal, and fox fur are used to make parkas, slippers, mukluks, and hats, and are used in making dolls, Eskimo yo-yo’s, and caribou skin masks. Feathers and skins are used to make drums and many other craft items, such as spirit masks.

It has been estimated that at least one in ten residents of the borough produces arts and crafts. These items may be traded, shared, given away, or sold. Prices of such items vary widely from ten or twenty dollars to thousands. These items are probably made for two basic reasons; for recreation and artistic expression, or to raise cash for a specific purpose, such as an airline ticket, but they are not produced solely for the purpose of generating income in order to perpetuate the craft (Steihn & Hayes, 1996).

D. Other Uses

1. Commercial and Sport fishing

In the entire NSB, seven residents held commercial fishing permits in 1995 (ADCRA, 1995). A commercial fall whitefish fishery is located outside of the sale area on the east channel of the Colville River. This gill-net fishery is the only commercial fishery within the Sale 87 area. In 1995, nearly 6,000 pounds of humpback or broad whitefish were harvested valued at $4,480 to fishers. In the same year, 9,121 pounds of Arctic cisco worth $12,541 to fishers were landed (Busher & Borba, 1996).

ADF&G tabulates non-subsistence sport fishing catch and harvest estimates for the entire North Slope drainage area. Fishing effort, catch and harvest for the Sagavanirktok River is also tracked. Most sport fish caught are not harvested, but released back to the water. For example, ADF&G estimates that 1,716 Arctic char were caught on the Sagavanirktok River by sport fishers in 1994, but only 147 were harvested. Similarly, an estimated 2,644 grayling were caught on the river, but only 147 were harvested (ADF&G, 1996b).

2. Sport Hunting, Guiding & Outfitting

Sport harvesting of big and small game in the onshore portion of the sale area is managed by ADF&G, Division of Wildlife Conservation. The state is divided into 26 game management units (GMU). All Arctic ocean drainages between Cape Lisburne and the Alaska-Canada border are contained in GMUs 26A, 26B, and 26C. Unit 26A lies west of the Itkillik River drainage, and west of the east bank of the Colville River between the mouth of the Itkillik River and the Arctic ocean. A significant portion on Unit 26A overlaps with the NPR-A. Unit 26B extends from the eastern boundary of 26A to the west bank of the Canning River, and the west bank of the Marsh Fork of the Canning River. All of Unit 26C is within the Arctic National Wildlife Refuge. It is unknown exactly how many animals of each species are harvested within the Sale 87 area in any given year.

Sport hunting harvest statistics collected by ADF&G are not specific to the Sale 87 area, but estimate the harvest of whole GMUs. Statistics on hunter residency, success rate, mode of transportation, and whether commercial services were used are also collected. Transportation data reflects the mode each hunter used to get to the point where they started walking (ADF&G, 1996b).

Hunting seasons and guidelines are determined by the Alaska Board of Game, and administered by ADF&G. The Prudhoe Unit is closed to big game hunting (5 AAC 92.510), however, residents may sport hunt in other oil fields. The Dalton Highway corridor (extending 5 miles from each side of the highway) is closed to big and small game hunting, except with bow and arrow, and use of motorized vehicles is restricted in the corridor. Firearm possession by industry employees is restricted and workers are not likely to sport hunt in the area during their active-duty shifts. Moose hunting is closed to non-residents on the North Slope (ADF&G, 1996c).

a. Brown Bear.

In the 1994-95 year, 20 brown bears were harvested by 20 hunters in GMU 26A. Of the 36 successful brown bear hunters on the North Slope, 27 used commercial services (ADF&G, 1996b).

b. Caribou.

In the 1994-95 year, 355 hunters took an estimated 1,130 caribou from the Western Arctic Herd (WAH) out of GMU 26A. Harvests of caribou from the Teshekpuk Lake herd were included in the WAH data, and ADF&G believes that there was a high unreported harvest (ADF&G, 1996b).

Of the 583 hunters seeking caribou in GMU 26B, 317 were successful in harvesting 341 animals of the Central Arctic Herd (CAH). Of the successful hunters, 80 used an airplane (25 percent), 214 used a highway vehicle (68 percent), 20 used a boat, and 3 used a horse or dog team to get to the hunting grounds. Only one successful hunter was reported to be a resident of the unit, while 244 (77 percent) were other Alaska residents, 69 (22 percent) were non-residents, and the other three hunters' residency status was unknown. Average hunter effort for unit 26B was 4.85 days (ADF&G, 1996b).

Of the 14 hunters seeking caribou in GMU 26C, nine were successful and harvested eleven caribou from the PCH. Of the successful hunters, seven used an airplane, and one used a snowmachine to access the hunting area. One successful hunter resided in the unit, five were other Alaska residents, and three were non-residents. Average hunter effort for unit 26C was six and a half days (ADF&G, 1996b).

Of all 597 hunters seeking caribou in GMUs 26B and 26C, at least 89 (15 percent) used commercial services, 363 (61 percent) did not, and it is unknown if the remaining 145 hunters employed commercial services in their hunts. Of the successful hunters in those two units, about 23 percent used commercial services to assist the hunt. Five and a half percent of the unsuccessful caribou hunters used commercial services in the 1994-95 year (ADF&G, 1996b).

c. Moose.

In the 1994-95 year, 84 moose were harvested from GMU 26; half of which were taken from Unit 26A, thirty-seven (44 percent) from unit 26B, and six (7 percent) from unit 26C. About half of the 167 hunters seeking moose on the North Slope were successful; of those, fifty-seven (68 percent) used commercial services to assist the hunt. In GMU 26A, 76 percent of the forty-one successful hunters used an airplane to get to the hunting area, while 20 percent used a boat, and the other two used a snowmachine and highway vehicle. Of the 37 successful hunters in unit 26B, 70 percent used an airplane, 22 percent used a boat, and 5 percent used a highway vehicle. Interestingly, 42 percent of the fifty hunters who did not get a moose in unit 26B, made their attempt with a highway vehicle indicating the limitations of road access sport hunting in the area. Five of the six hunters who got a moose in unit 26C, did so with the use of an airplane, the other used a snowmachine (ADF&G, 1996b).

d. Wolf.

Of the 69 wolves harvested from GMU 26 in the 1994-95 year, 46 were taken from unit 26A, eighteen from 26B, and five from 26C. In Unit 26A, 76 percent of the 46 successful hunters used a snowmachine to access the hunting area, 22 percent used an airplane, and one walked. In Unit 26B, six out of 18 successful hunters used an airplane, one used a boat, one used a snowmachine, one walked, and the mode of transportation for the other was not known (ADF&G, 1996b).

e. Other Animals.

In the 1994-95 year, no muskox were harvested in Unit 26A; two Tier II subsistence permits were issued to residents of Unit 26B, but none were harvested; and seven muskox were harvested by snowmachine by residents of Unit 26C (Kaktovik) under federal subsistence rules. Two-thirds of the 24 wolverines taken west of the Canning River drainage, and the remainder from 26B. Half of wolverine harvesters used a snowmachine, 21 percent used an airplane, and 13 percent used a highway vehicle to reach hunting or trapping grounds (ADF&G, 1996b).

The level of sport hunting of waterfowl on the North Slope is currently very low. This is likely due to the number of hunters seeking them, rather than other factors, such as low population levels, climatic

conditions affecting migration, or regulatory constraints. The estimated number of hunter-days afield (number of active waterfowl hunters multiplied by the number of days spent in the field) was 17 for the 1994-95 year; down from 157 hunter-days in the previous year. ADF&G reports that "there are fewer Alaskans hunting waterfowl than any time since the surge in the state's population during the 1970s." (ADF&G, 1996b:59)

3. Tourism and Recreation

According to a 1993 survey conducted by the state Division of Tourism & Trade, 35,400 Alaska visitors traveled the Trans-Alaska Pipeline haul road (Dalton Highway), 17,700 visitors toured the Prudhoe Bay oil fields, and 3,000 visitors saw Barrow, the northernmost point in North America (ADCED, 1993:57). Anaktuvuk Pass, hosts about 1,500 tourists each year, and is the only community in the borough other than Barrow that sees a substantial number of tourists (NSB, 1993:65).

Recreational uses of the Sale 87 area include hiking, skiing, flight-seeing, boating or rafting. Each of these activities has its associated costs, which can be very high in the Arctic. Considering the remoteness and isolation of the sale area, all recreationists must use some kind of commercial outfitter to access the area, and nearly all must fly in. Most outfitters are based out of Fairbanks. In summer, visitors come to the region to camp, hike, float down the Canning River in a river raft, or watch and film whales, birds or caribou.

After October, there are virtually no non-resident recreationists in the sale area. Winter recreation for residents usually occurs near villages. The most favorable months for winter activities such as snow machining and dog sledding are mid-March to early May, when temperatures are higher and daylight hours longer (NSBCMP, 1984a:3-29). The colder and darker months of winter are ideal for social gatherings and craftmaking.

4. Oil and Gas Extraction

Several oil and gas fields are in production or are being developed in or adjacent to the sale area including Endicott, Niakuk, Lisburne, West Beach, North Prudhoe Bay, Pt. McIntyre, and Milne Pt. Plans are underway to develop untapped fields including the Alpine, Northstar, Badami, and Pt. Thompson prospects (see Chapter Two, Exploration History). Four shipping and production structures exist on the Beaufort coast at Olitok Point, West Dock, Heald Point, and Endicott. A dock has also been proposed to facilitate the development of reserves east of the Sagavanirktok River delta. Pipelines have been proposed to connect Colville Delta area production with existing Kuparuk River infrastructure, and Mikkelsen Bay area production with existing Prudhoe Bay, Endicott or Lisburne infrastructure. All proposals involve transporting future production via the Trans-Alaska Pipeline.

E. References

Ahmaogak, G.
1996b Written Comments to Cynthia Quarterman, Director, MMS Regarding OCS Oil and Gas Lease Program: 1997-2002, Draft EIS. May 7.

ADF&G
1996a Nuiqsut: Wild Resource Harvests and Uses in 1993. Division of Subsistence, Alaska Department of Fish and Game, January.
1996b Alaska Wildlife Harvest Summary, 1994-1995. Alaska Department of Fish & Game, Division of Wildlife Conservation, Information Management Section, Wildlife Information Data Base Project, March 6.
1996c Alaska Hunting Regulations, No. 37. Alaska Department of Fish and Game, Division of Wildlife Conservation, Effective Dates July 1, 1996-June 30, 1997.
1995 Community Profile Database, Volume 5: Arctic Region. Division of Subsistence, Alaska Department of Fish and Game, Juneau, September.
1986 Alaska Habitat Management Guide, Arctic Region Volume II: Distribution, Abundance and Human Use of Fish and Wildlife. Division of Habitat, Alaska Department of Fish and Game, Juneau.

ADCED
1993 Alaska Visitor Patterns, Opinions and Planning, Summer 1993. Alaska Department of Commerce and Economic Development, Division of Tourism, Alaska Visitor Statistics Program, Prepared by the McDowell Group, Juneau.

ADCRA
1997 DCRA Community Database. Department of Community and Regional Affairs, Research and Analysis Section.
1995 DCRA Community Database. Department of Community and Regional Affairs, Research and Analysis Section.

ADOL
1996a Labor Department Estimates Alaska's 1996 Population. Alaska Department of Labor, Division of Administrative Services, Press Release, September 24.
1996b Draft 1996 Employment & Earnings Summary Report. Alaska Department of Labor, Division of Administrative Services.

AEWC (Alaska Eskimo Whaling Commission)
1997 Personal communication from Maggie Ahmaogak, Executive Director, AEWC, to Brian Havelock, DO&G, April 30.

Busher, William & Borba, Bonnie
1996 Commercial Finfish Catch Statistics for the Upper Yukon and Northern Management Areas, 1995. Alaska Department of Fish & Game, Commercial Fisheries Management and Development Division, A-Y-K Region, Regional Information Report No. 3A96-07, January.

Bryner, William M.
1995 Toward a Group Rights Theory for Remedying Harm to the Subsistence Culture of Alaskan Natives. Alaska Law Review, Vol. 12:2, pp. 293-334.

Carroll, Geoff
1996 Personal communication with Geoff Carroll, ADF&G, to Brian Havelock, DO&G, May 7.

George, John C., and Benjamin P. Nageak
1986 Observations on the Colville River Subsistence Fishery at Nuiqsut, Alaska, for the period 4 July - 1 November 1984. Department of Wildlife Management, North Slope Borough, July.

Haynes, Terry and Sverre Pederson
1989 Development and Subsistence: Life After Oil. Alaska Fish and Game, 21(6): p.24-27, November-December.

Hoffman, David, David Libbey, and Grant Spearman
1988 Nuiqsut: Land Use Values Through Time in the Nuiqsut Area. North Slope Borough and The Anthropology and Historic Preservation Section of the Cooperative Park Studies Unit, University of Alaska, Fairbanks, Occasional Paper Number 12, 1978, Rev. 1988.

Jacobson, Michael, J., and Cynthia Wentworth
1982 Kaktovik Subsistence: Land Use Values Through Time in the Arctic National Wildlife Refuge Area. USF&WS, Northern Alaska Ecological Services, Fairbanks.

Lampe, Leonard
1996 Written comments of Leonard Lampe, Vice-Mayor of Nuiqsut, to DO&G Regarding Proposed Oil and Gas Lease Proposed Sale 86, March 13, 1996.

Langdon, Steve J.
1996 An overview of North Slope Society: Past and Future. Steve J. Langdon, Department of Anthropology, University of Alaska Anchorage, *In* Proceedings of the 1995 Arctic Synthesis Meeting, Minerals Management Service OCS Study MMS 95-0065, February.

Long, Frank Jr.
1996 History of Subsistence Whaling by Nuiqsut. Frank Long Jr., President of the Nuiqsut Whaling Captains Association, *In* Proceedings of the 1995 Arctic Synthesis Meeting, Minerals Management Service OCS Study MMS 95-0065, February.

MMS (Minerals Management Service)
1995 An Investigation of Socicultural Consequences of Outer Continental Shelf Development in Alaska, Volume V, Chapter XXII, MMS 95-014, March.
1990 Subsistence Resource Harvest Patterns: Kaktovik: Final Special Report no. 9. Prepared by Impact Assessment Inc., for Minerals Management Service, OCS Region, July 24.
1987 Subsistence Fisheries at Coastal Villages in the Alaskan Arctic, 1970-1986. Prepared by Peter C. Craig, LGL Alaska Research Associates, Inc. for Minerals Management Service, OCS Region, OCS Study MMS 87-0044, July.

Noland, L.J. & Gallagher, T.
1989 Cross-Cultural Communication for Land Managers and Planners in Alaska. In Agroborealis, Vol. 21, No. 1.

NRC
1994 Environmental Information for Outer Continental Shelf Oil and Gas Decisions in Alaska, National Research Council, National Academy Press.

NSB
1997 North Slope Borough Subsistence Documentation Project: Data for Nuiqsut, Alaska for the period July 1, 1994 to June 30, 1995. Prepared by Harry K. Brower, Jr., and Raynita "Taqulik" Opie, NSB Department of Wildlife Management, January 14.
1996 North Slope Borough Subsistence Documentation Project: Data for Anaktuvuk Pass, Alaska for the period July 1, 1994 to June 30, 1995. Prepared by Harry K. Brower, Jr., and Raynita "Taqulik" Opie, NSB Department of Wildlife Management, September 16.

1994 Comprehensive Annual Financial Report of the North Slope Borough, Alaska: Fiscal Year July 1, 1993-June 30, 1994. Prepared by Department of Administration and Finance, North Slope Borough.
1993 North Slope Borough 1993/94 Economic Profile and Census Report, Vol. VII. North Slope Borough, Department of Planning & Community Services.
1979 Nuiqsut Heritage: A Cultural Plan. Prepared for the Village of Nuiqsut and the North Slope Borough Planning Commission and Commission on History and Culture, February.

NSBCMP
1988 North Slope Borough Coastal Management Program. Maynard & Partch, Woodward-Clyde Consultants, April.
1984a North Slope Borough Coastal Management Program Background Report. Maynard & Partch, Woodward-Clyde Consultants.
1984b North Slope Borough Coastal Management Program Resource Atlas. Maynard & Partch, Woodward-Clyde Consultants, July.

Pederson, Sverre
1997 Personal communication between Sverre Pederson, ADF&G Subsistence Division and Tom Bucceri, DO&G, July 7.
1990 Caribou Hunting: Land Use Dimensions, Harvest Level, and Selected Aspects of the Hunt During Regulatory Year 1987-88 in Kaktovik, Alaska. Division of Subsistence, Alaska Department of Fish and Game, Technical Paper No. 171.

Pederson, Sverre, Haynes, Terry L., and Wolfe, Robert J.
1991 Historic and Current Use of Musk Ox by Kaktovik Residents. Division of Subsistence, Alaska Department of Fish and Game, Technical Paper No. 206.

Pederson, Sverre, Coffing, Michael W., and Thompson, Jane.
1985 Subsistence Land Use Baseline for Kaktovik, Alaska. Division of Subsistence, Alaska Department of Fish and Game, Technical Paper No. 109.

Steihn, Lynn, and Hayes, Helen
1996 Personal communications with Lynn Steihn and Helen Hayes, Arctic Development Council, and Brian Havelock, DO&G, October 25 and November 1.

USF&WS
1988 Subsistence Management and Use: Implementation of Title VIII of ANILCA: Final. United States Fish and Wildlife Service, Anchorage, March.